

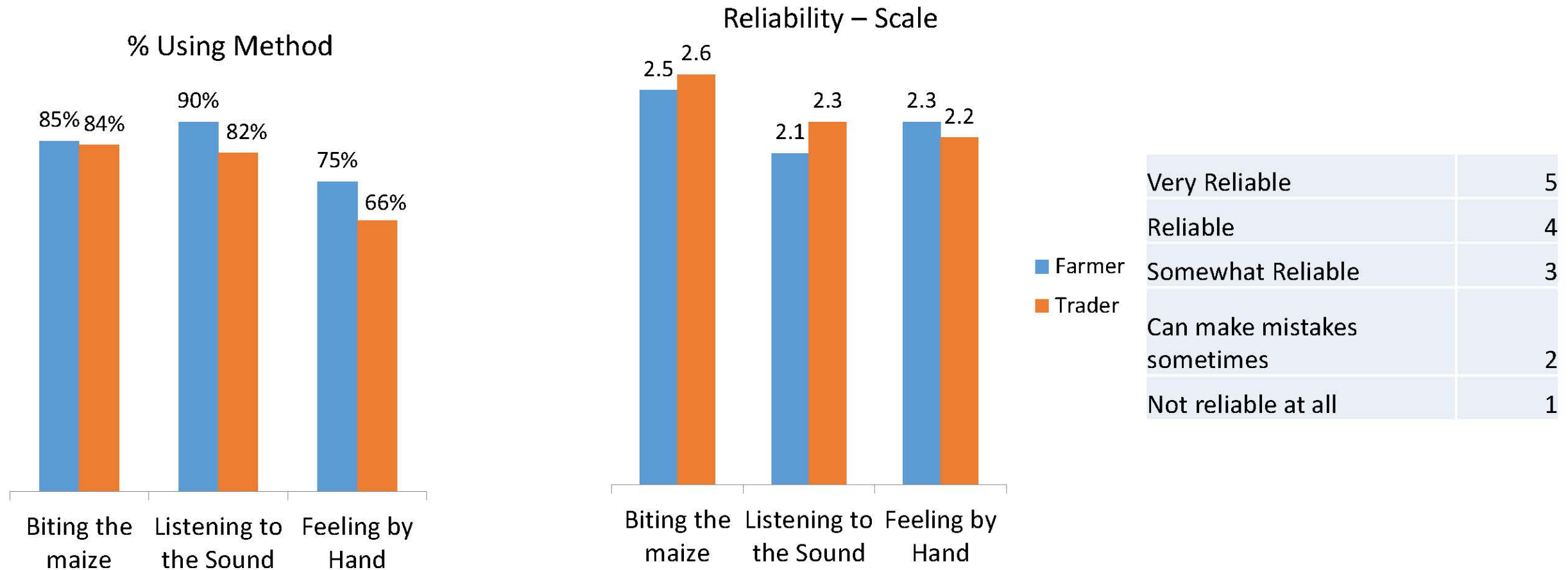
Scaling up low-cost moisture meters to improve income, food safety and health.

Hira Channa [†], Jacob Ricker-Gilbert [†], Charles P Woloshuk [¥]

[†] Agriculture Economics, Purdue University

[¥] Botany and Plant Pathology, Purdue University

Variety of “local” methods used to test moisture (western Kenya)



People recognize that traditional methods are error prone!

Motivation

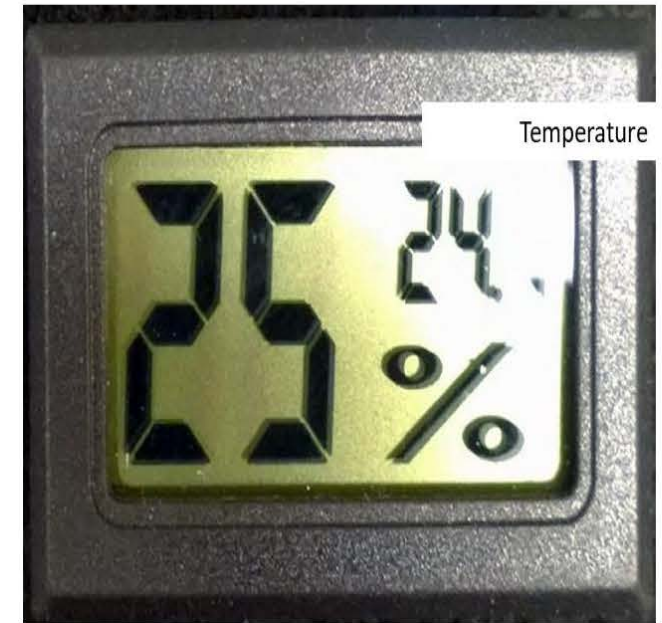
- Moisture meters, used in developed world are expensive ($>$ US \$150)
 - Unattainable and unavailable for most smallholders and small-scale traders.
- Economic issues:
 - Moisture not fully observable without meter
 - Kenyan cereal board (NCPB) purchases only if moisture content is below 13%



Our technology: Hygrometer

- Hygrometer
 - Standard household device calibrated at Purdue University's Food Processing and Post-Harvest Handling (FPL) Innovation Lab
 - Provides a numeric reading
 - Imported from China
 - Est. Wholesale price = US \$0.90

Hygrometer



Humidity

Estimated Price
USD 0.90

Demonstration

- Demonstrated hygrometer working and another technology the DryCard™
- Four bags of maize were carried by enumerator
 - 2 bags with dry and 2 bags of wet maize
- Hygrometer and DryCard™ were each put in a dry and wet bag of maize respectively



Becker De Groot Maschak (BDM) Auction

Benefit

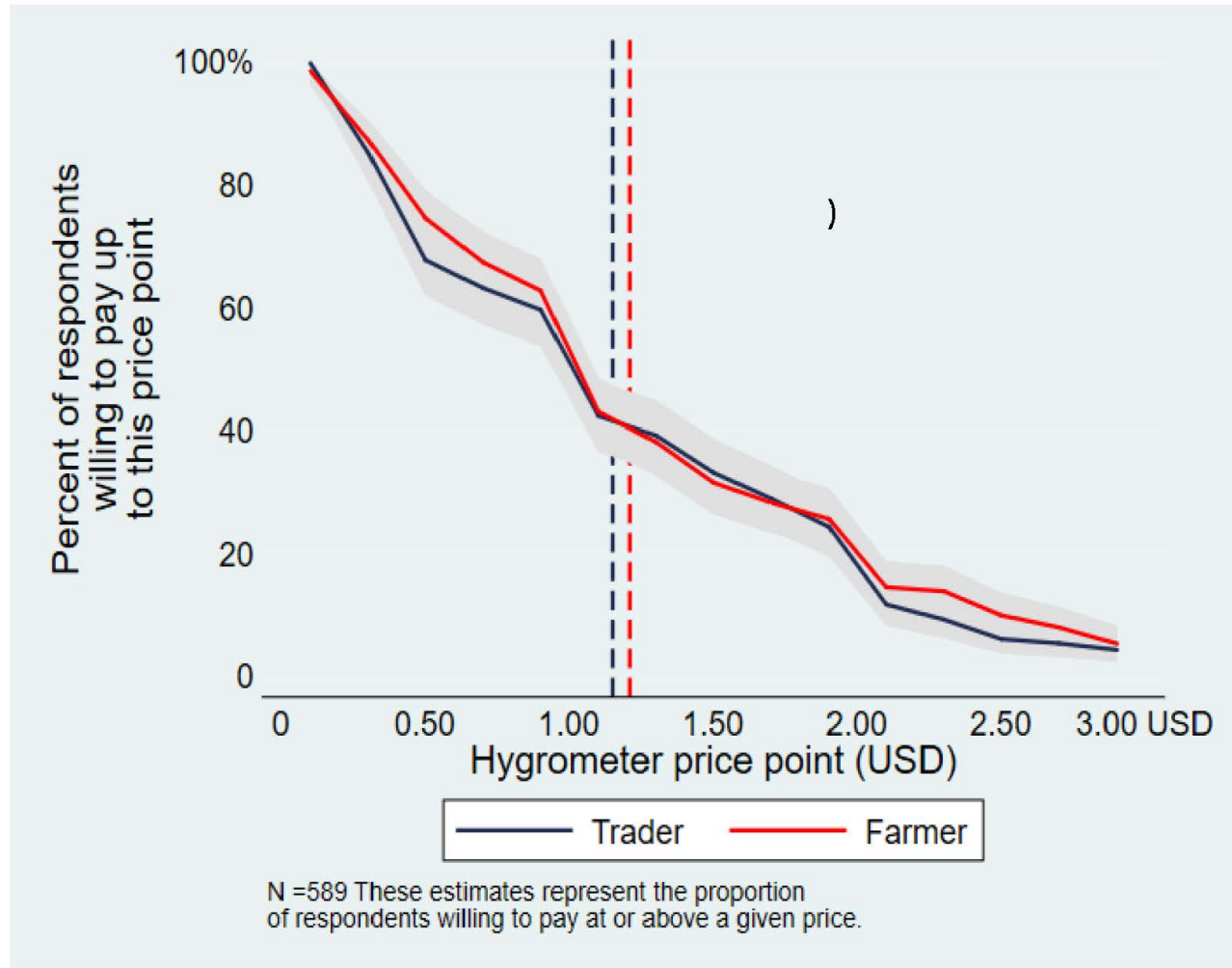
- **Involves actual purchase**
- Possible on a one to one basis
- Price actually paid is random

Process

- Participant bid is compared to random price
- If random price is higher then no transaction

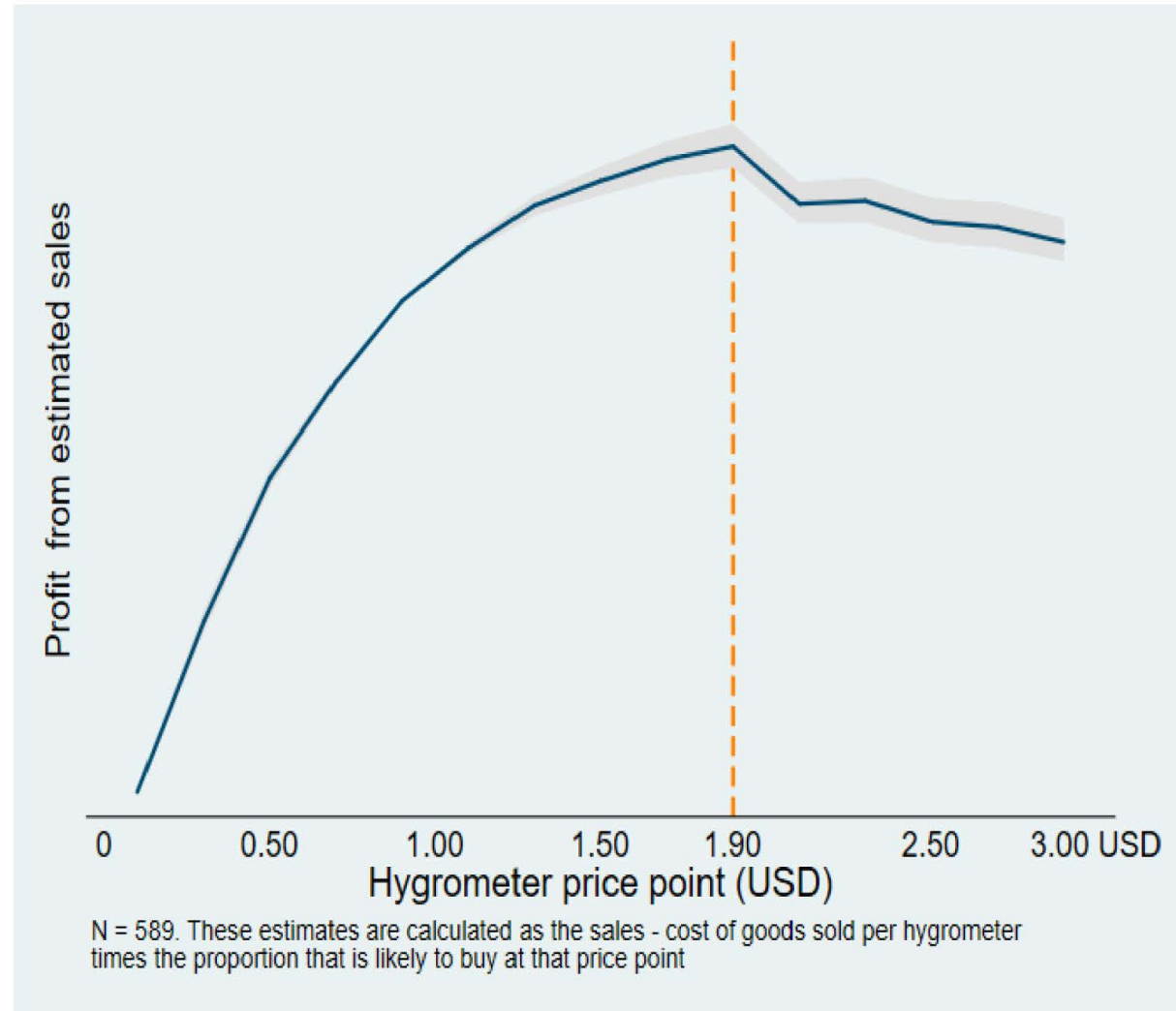


Demand Curves



- Involves plotting out percent of population purchasing on y axis and the price on the x axis
- The dotted lines display mean willingness to pay for farmers (1.30 USD) and traders (1.20 USD)

Profit for wholesalers



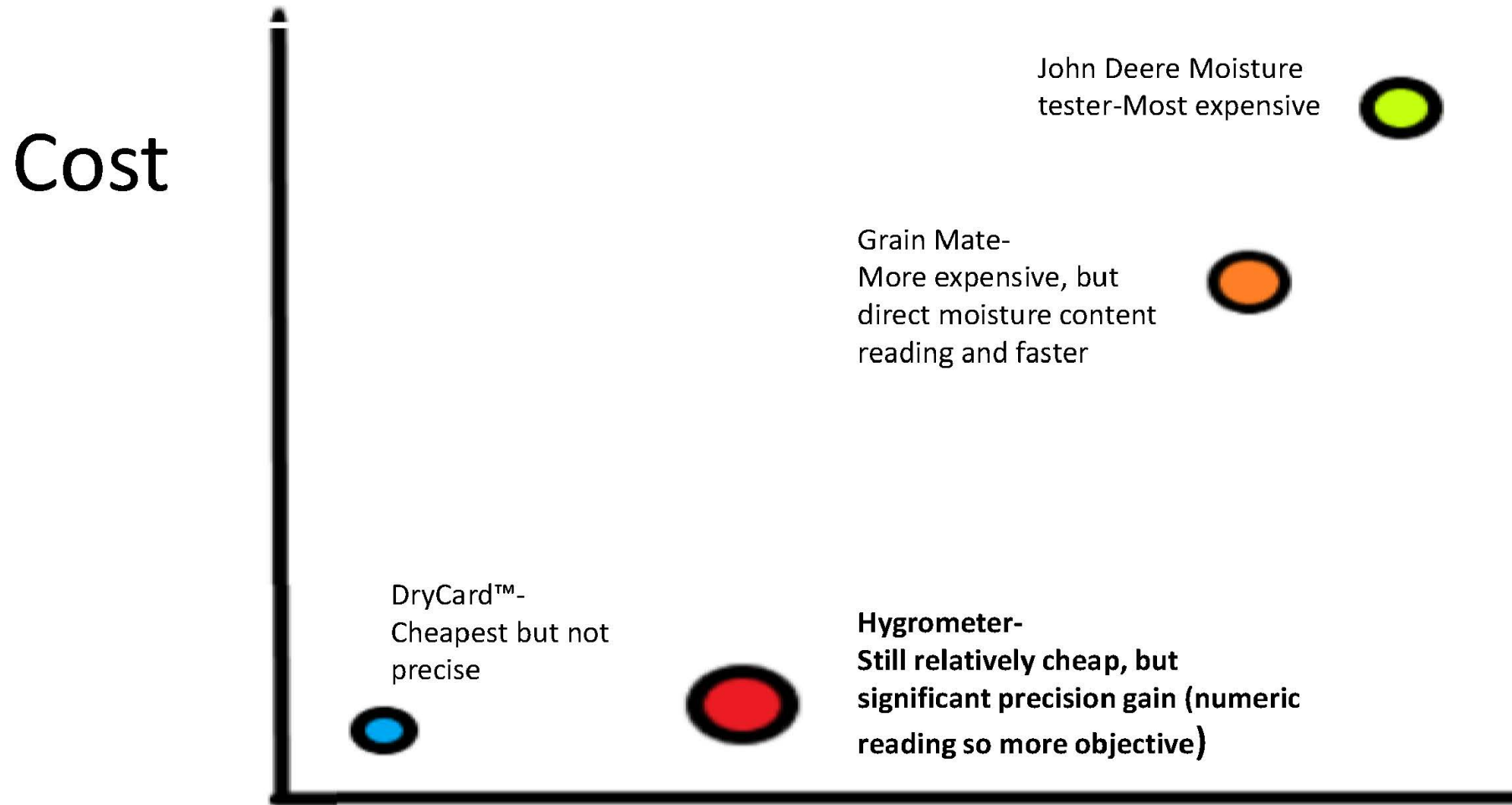
- Assuming constant cost \$0.9/hygrometer Estimate Profit by multiplying the proportion of population likely to buy at each price with the margin at each price
- Profit for Hygrometer can be maximized by selling at \$ 1.90 to 25% of the population

How does the hygrometer compare?

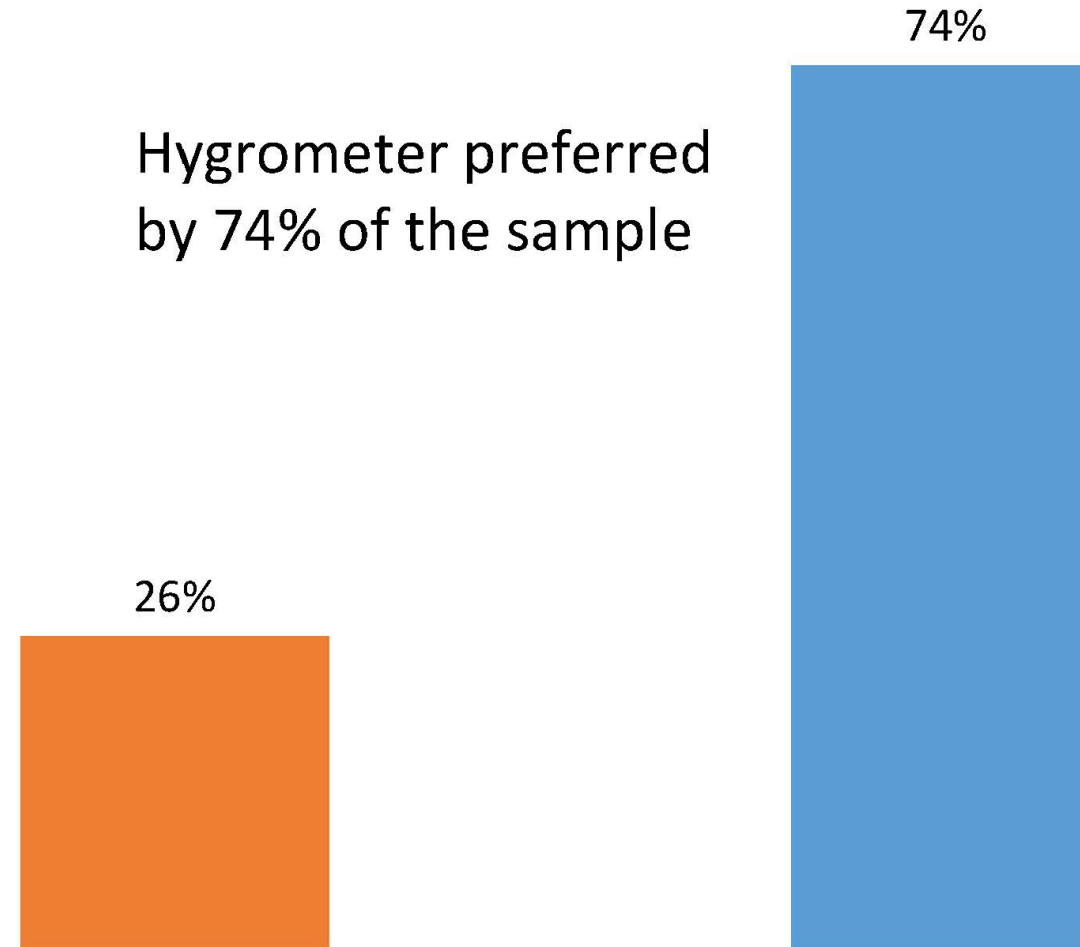
Cost

Effectiveness=Precision+Time

How does the hygrometer compare?

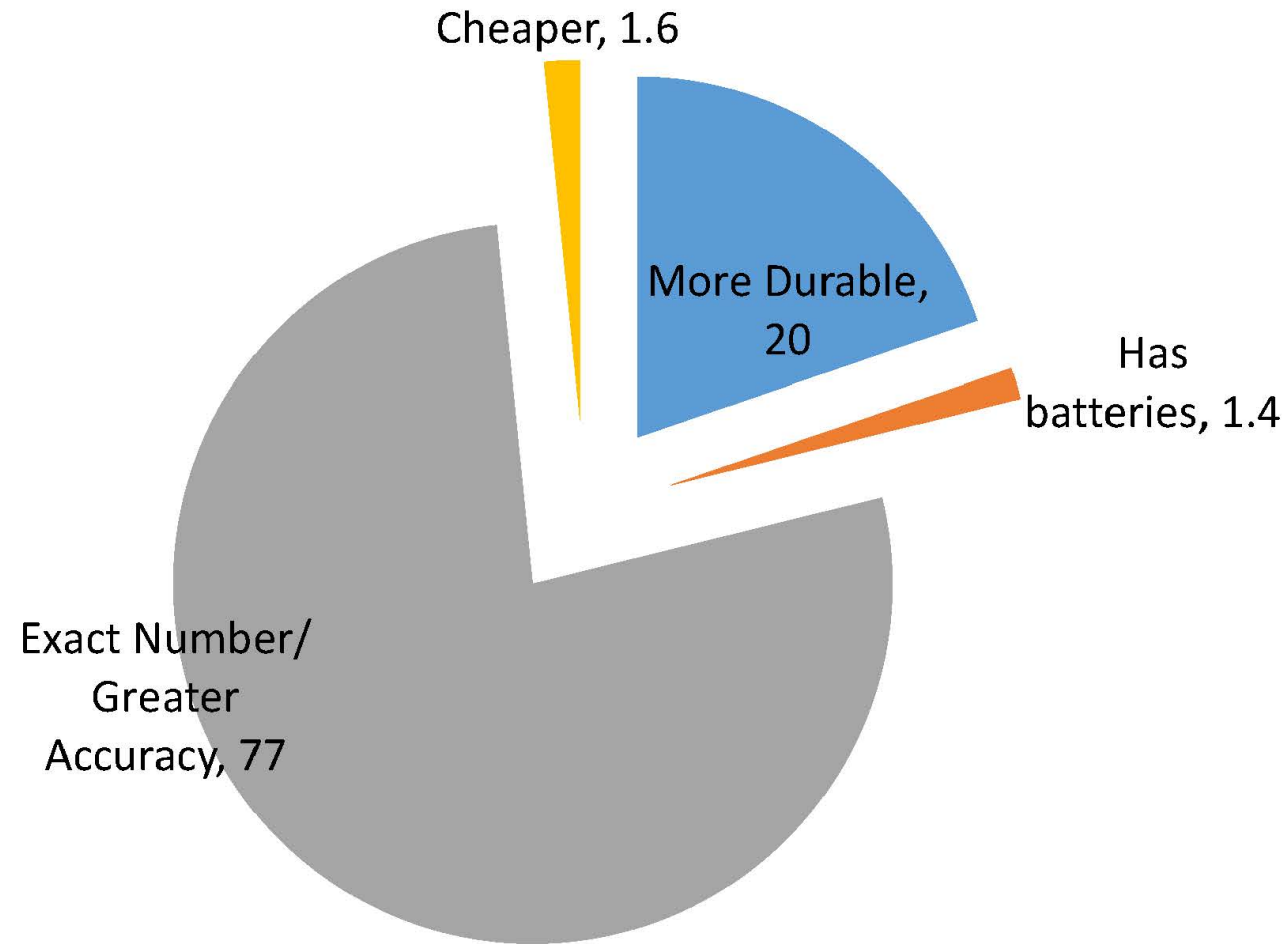


If both devices were available to you at the price you bid which one would you prefer?



Reason for preference of Hygrometer

Hygrometer



Future Steps

- Household device-Available for purchase from multiple manufacturers
 - If a bulk purchase is made directly from the manufacturer, the per-unit price of the hygrometer can be lowered below \$0.90.
- Plan to use the input supply chain for the Purdue Improved Crop Storage Bags in Kenya (Bell Industries)
- Bell Industries will look into getting permission to classify each commodity as an agricultural input in order to gain import tax exemption.
- Train extension workers from KALRO on the usage of the product in the areas where we are piloting the product.
- Need follow-up research on how well the hygrometer and DryCard™ have done in the field